Hemi-Sync . . . stereo earphones or speakers?

When earphones are used, the listener experiences the sensation of binaural beating. The sensation of auditory binaural beats occurs when two coherent sounds of nearly similar frequencies are presented one to each ear. The brain integrates the two signals, producing a sensation of a third sound called the binaural beat. Binaural beats originate in the brainstem's superior olivary nucleus, the site of contralateral integration of auditory input. This auditory sensation is neurologically conveyed to the reticular formation and simultaneously volume conducted to the cortex where it can be objectively measured as a frequency-following response (FFR) using EEG evoked-potential protocols.

When speakers are used the listener experiences very little binaural beating. The primary beat stimulus becomes monaural beating, the sounds from the two speakers being mixed together in the open air before being perceived by the listener. Monaural beating also produces a frequency-following response observable at the cortex. Evoked-potential research conducted at the Mount Sinai School of Medicine on both binaural and monaural beating shows that they are processed differently in the brain.

Unlike monaural beating with speakers, listening to binaural beats with stereo earphones produces the illusion that the sounds are located somewhere within the head. When binaural beats are very low frequency, less that 3 Hz, they seem to move back and forth in the head. If the intensities of the right-ear and left-ear tones are different, an apparent elliptical orbit of the beating develops.

Both monaural and binaural beats produce a measurable EEG frequency-following response. The amplitude of the frequency-following response to monaural beats is higher however. How this fact alone impacts on the effectiveness of one stimuli over the other in altering consciousness remains unknown. Here are some other differences:

- Binaural beats can be perceived only when the right-ear and left-ear tones used to produce them are of low pitch, usually less than 1000 Hz.
- Monaural beats produced with two tones of equal intensity sound clean and pure.
- Binaural beats have a muffled sound—only a slight modulation of the relatively loud right-ear and left-ear *carrier* tones.
- To produce perfect monaural beats the amplitudes of the two tones have to be identical.
- Binaural beats maintain their intensity regardless of the relative amplitudes of the right-ear and left-ear tones even if one ear is below threshold.
- Masking monaural beats with noise eliminates the perception of beating and the measurable EEG frequency-following response.
- Masking binaural beats with noise **enhances** their perception.

Note: Pink sound (equalized white noise) is mixed to with Hemi-Sync's binaural beats to intensify their effectiveness. Research has shown that noise enhances the perception of binaural beats. Additionally, when experienced with earphones, the pink sound used in the Hemi-Sync process provides a *ganzfeld* (a word meaning "homogenized field") environment ideal for consciousness exploration. Ganzfeld research shows that people experience consciousness shifts when exposed to a ganzfeld stimulus. In the ganzfeld, one's mind turns inward and the reticular activating system attends to the specially designed Hemi-Sync binaural beats and one experiences realms not accessible in other states of consciousness.

Given current understanding, here are some guidelines on the use of stereo earphones verses speakers when listening to Hemi-Sync:

1. Stereo headphones are probably better when pink sound is used to mask Hemi-Sync's binaural beats (as in many Focus-level programs) because binaural beating is enhanced by pink sound (not the case with monaural beating experienced with speaker use). Use of earphones promotes the ganzfeld effect of the pink sound and enhances chances for experiencing altered states.
2. Speakers are probably okay when music is used to mask Hemi-Sync's binaural beats as in meditation and stress-reduction exercises, enhanced-learning programs, and **Metamusic** selections. Unlike pink sound, music will not diminish the monaural beating produced by the speakers.
3. When speakers are used, positioning left and right of the listener rather than in front would emphasize binaural over monaural beating because the amplitude of the left or right carrier signal is not relevant in the case of binaural beating. Positioning speakers left and right in a classroom would provide binaural beating to all listeners regardless of their individual location within the room. Monaural beating will be accentuated if stereo speakers are positioned in front of listeners because all would hear at relatively equal volume levels from both speakers. Placing the stereo speakers close together in front of a group would be fine.
4. Remember that masking with pink sound enhances binaural beating but weakens monaural beating. Also, a pink-sound ganzfeld is beneficial to the development of altered-state experiences. So it is best to use stereo earphones when pink-sound masking is used.